Transportable safety module construction.

This invention relates to a transportable safety module construction which in folded down position is easily transportable and may be used for screening off certain objects. For that purpose up till now so called building fences are used, among others for screening off buildings like embassies or for screening off terrains where events are taking place. Building fences however have the disadvantage of not being stable, light of weight and easily deformable in case high security requirements are desired.

Object of the invention is a transportable stable safety construction of sufficient height and thus also resistant to undesired clambering over by persons, but which construction being also highly stable by the fact that it occupies a large ground surface and also for storing of great numbers being easily foldable down and thereby occupying little space in that position. The safety module construction is further provided on both sides with intercoupling means enabling a closed front to be constructed from a number of intercoupled modules, so that an object to be secured may be completely surrounded by a closed line of wall modules.

The construction of a safety module principally consists of a relatively heavy rectangular horizontal floor frame construction of such a large surface that possible tilting thereof is inconceivable. The dimensions of the floor frame are at least 350 cm by 255 cm (length x width). On top of the longitudinal centre axis of this floor frame an upright wall construction or safety frame is positioned with a height of approximately 250 cm. This wall may be entirely closed so that no view through exists to the opposite side thereof. Moreover to reduce the zest of persons for clambering over, the invention provides in an extra safeguarded top edge along the full length of the wall construction by the application of sharply pointed anti clamber elements.

The outlined edges of every separate frame for the floor and the wall may consist of relatively heavy L- or U-shaped profile beams or hollow profile beams, dependent how it will fit in the construction for optimal safeguarding. Between the

aforesaid beams usual reinforcement profile beams may be provided for. The wall may consists of one piece of sheet material but it may also consists of separate adjacent wall profiles shaped as panel segments which may be horizontally or vertically joined together into a closed wall, thereby e.g. framed into a fitting U-shaped profile.

If the upright wall construction is positioned permanently all around an object to be protected the frame may be welded or not onto the floor frame or fixed thereto by some other means and supported by two or more shores which are located at the rear side of the wall construction to provide for the required stability and security to the wall construction. However, if the safety module construction is transported frequently from a storage depot to an object to be protected it is desirable to use an easily manageable design, which is easily stackable and so occupies little space. Preferably the safety module is provided with means which facilitate the folding up and down of the wall construction and/or provided with means which interlock the wall construction in its mounted position.

Other embodiments of the safety module construction are described in the claims and the invention will now be further explained by means of an example of an embodiment.

Fig. 1 is a perspective rear view of the safety module construction according to the invention;

Fig. 2 is a perspective front view of the safety module construction according to Fig.1;

Fig. 3 shows a side view of this safety module construction;

Fig. 4 shows a detail of the extra safeguarded top edge of the vertical frame wall;

Fig. 5 shows a side view of the safety module construction of Fig.3 in folded down position;

Fig. 6 is a perspective top view of the safety module construction in folded down position with the guide element on the wall construction and a guide channel formed in the floor frame;

Fig. 7 is a perspective side view of the safety construction according to Fig.6 showing the guide wheel of the wall construction engaging the guide rail on the floor frame;

Fig. 8 shows a perspective view of the safety module construction version in disassembled position together with a shore which for its major part is received in a reinforcement profile;

Fig. 9 shows in a rear view a detail of two intercoupled safety module constructions with wall constructions having a smaller width than the floor frame and

Fig. 10 shows in front view a detail of two safety module constructions with two guide wheels which are received in recesses in the guide rails.

In Fig. 1-4 the rectangular shaped floor frame V consists of a number of interwelded U-shaped profile beams 1 and 2 and of some hollow reinforcement beams 3 and 4. At the position were these hollow reinforcement beams 3 and 4 are interconnected by welding to the profile beams 1 and 2 rectangular openings 7 and 8 are formed. In these openings 7 and 8 the forks of a fork-lift truck may be inserted for transport of the floor frame V. Also in the short rectangular sides of the floor frame V similar recessed openings 9 and 10 are provided. On the longitudinal central axis of this floor frame a vertical wall construction W is positioned, having a width which being equal to the floor frame V. The wall construction W consists in this embodiment of a rectangular frame of circumferential profiles 11, 12 and 26 between which are provided welded horizontal and vertical reinforcement profiles 13 and 14. On the front side of the circumferential profiles the wall construction is covered by a closed surface, in this example comprising a number of vertical panel segments 15 of profile steel plate joined together and forming the safety wall construction W. If desired for weight reduction the panel segments 15 may be manufactured from aluminium material. The panel segments 15 may be framed in a U-shaped profile and subsequently the

framed profile may be totally welded upon the upright wall construction W. There are several other technical options to mount parts of the closed wall, e.g. by spot welding or by means of mounting with bolts. In order to secure the vertical position of the wall construction on its rear side two shores 16 and 17 are mounted. If no hinged connection with the wall construction W is intended, then the ends of the shores 16 and 17 may be fixedly welded. For the embodiment shown in Fig. 1-10 a movable connection has been chosen between the wall construction W and a circumferential edge profile 2 of the floor frame V. This connection consists of a hinged connection 18 between the base of the shores 16 and 17 with an upright profile part 19, connected with the horizontal profile beam 2, e.g. by welding. This hinged connection 18 may be formed by a detachable bolt connection. Shores 16 and 17 are at their upper end also connected by a hinged connection 20 to the vertical frame reinforcement profiles 14. The horizontal bottom part 12 of the wall construction W may be fixedly secured to the floor frame V by means of e.g. a bolt connection. A similar bolt connection may be mounted adjacent to the bottom ends 5 and 6 of the vertical profiles 14. On the top side of the floor frame V an optionally perforated steel sheet S is attached as cover. Preferably a completely closed sheet is used like a "tear-plate" in order to make the upper side of the safety module construction inadmissible for malevolence persons.

As shown in Fig.9 it may be desirable during positioning and joining of a row of adjacent safety module constructions upon an irregular non-horizontal surface to allow for a mutually distant space between the wall constructions (W, W') with a distance of e.g. 5 cm. This space may be filled later with sheet strips (not drawn) of the same height as of the wall construction.

The safety module construction may be constructed in an alternative embodiment as a permanent upright wall construction, so that no means for downward folding are needed, whereas its transportability is still possible. Another more practical embodiment enables the foldability down of the construction into a rectangular package of the floor frame with on it top of it the wall construction; the package having a total height of approx. 20 cm.

Fig. 1, 3, 5 and 8 show how the frame parts W and V make it possible to be transported in a folded down position by use of openings 9 and 10 provided for in

the floor frame for the forks of the fork-lift truck. By disassembling one or more of the bolt connections 21 between two adjacent safety module constructions, e.g. a bolt and a nut which optionally also may serve as a locking element, the bottom part of the wall construction W in Fig.1 and 3 may be displaced to the left allowing the wall construction to be flatly positioned upon the floor frame V. The resulting total height of the floor frame and the wall construction will be no more than 2 x 10 cm so that the stackability of a great number of safety modules is ensured en subsequently will thus occupy little storage space.

Fig.5 shows a preferred embodiment of the safety module construction, the hinged shores 16, 17 being completely received in the wall construction W so that the safety module construction in its disassembled position comprises on its top surface no parts of the shores 16, 17 extending outside the framework of the edge profiles, so allowing the disassembled safety module constructions easily stackable, e.g. for transport.

In Fig.1 and 8 another embodiment is shown, in which the shore 16 for its major part is received in the hollow space of a U-shaped reinforcement profile 14. As a result the shore 16 is safely enclosed within the reinforcement profile 14 and will be less easy damaged or buckled during stacking upon each other or during transport.

As shown in Fig. 1, 3, 5, 8 the shore 16 hinges over a connection point 18 at its bottom part on the upright profile part 19, which point is located at some distance above the edge circumference or profile beam 2, so that the shore, from its upper end to its lower end, fittingly rests into the U-shaped reinforcement profile 14 and the shore principally parallelly extends in the same direction as of the profile 14.

Fig.5 and 8 shows that the upright profile part 19 has also the function of a locking element. Thereto in its disassembled position the safety module construction the profile part 19 will extend beyond the wall construction W with its top side into the opening or hollow space of the U-shaped profile beam of a safety module construction positioned thereupon, in order to prevent mutual displacement of interstacked safety module constructions. For the locking element many equivalent embodiments are possible like mounting of one or more locking elements on e.g.

the top circumferential profile 26 or upon the reinforcement profile 14 of the wall construction W or upon an alternative location upon the floor frame V.

In order to facilitate the folding up and down of the relatively heavy wall construction into its mounted and disassembled position, preferably the wall construction W is provided with additional means like e.g. hoisting eyes/hooks or guide elements.

Fig.1 shows two hoisting eyes/hooks 25 by means of which hoisting means known per se like a hoisting chain and a hoisting crane or a fork-lift truck may hoist the wall construction W allowing it to be folded up into its upright, mounted position. To secure that the construction wall, in other words the bottom edge 12, during hoisting and folding up will remain principally parallel to the longitudinal central axis of the floor frame and to prevent additional torque forces in the shores, guide means are used like guide channels and guide wheels.

In Fig.6 a part of the floor frame V is shown with U-shaped profile beams 1 and 2 and a part of the wall construction W with the upright edge profile 11 and the lower circumferential profile 12 with interconnected by welding to guide element 27. The guide element 27 comprises a rectangular headed or hooked element 28 which extends into the guide channel 30, which in this embodiment is formed between the profile beam 1 and the parallelly mounted profile beam 31. During folding up and down of the wall construction W the guide channel 30 and the guide element 27 moving therein will ensure that the wall construction W will hardly tilt with respect to the longitudinal central axis of the floor frame V. The guide means 27 may be applied to the safety module construction over the total length of the lower circumferential profile 12; preferably two guide means are mounted to both ends of the bottom edge 12 near the upright edge profiles 11. The guide means may be mounted easily at that location and will so optimally prevent tilting of the wall construction W.

In order to facilitate the folding up and down of the wall construction W and in order to reduce abrasive wear of the displacing parts of the safety module construction, preferably the wall construction is provided with one or more guide wheels 31, as shown in Fig.7. During the folding up and down of the wall construction W the

guide wheels 31 roll over guide rails 32 so that the wall construction is principally supported by the guide wheels 31 because the roller surface extends beyond the framework of the edge profiles 11, 26. Preferably the bottom edge 12 of the wall construction W is provided with at least two mutually distantly spaced guide wheels 31 and of at least two mutually distantly spaced guide elements 27 and the floor frame V is provided with at least two guide rails 32 and of at least two guide channels 30. In a more sophisticated embodiment the guide wheels 31 are mounted adjacent to the guide elements 27 and accordingly the guide rails 32 are mounted adjacent to the guide channels 30, as shown in Fig. 6 and 7.

In order to support the bottom edge 12 of the wall construction W in mounted position by the floor frame recesses 33 are provided in the guide rails 32 to receive the guide wheels 31, as shown in Fig. 10. Fig. 9 shows, that the wall construction W in upright/mounted position is supported upon the profile beam 1 of floor frame V and is no longer supported by the guide wheels. These measures have further the advantage that they do increase the safety of the safety module construction, because the wall construction W cannot easily be displaced away, or roll away, from its mounted position and subsequently fold down, because the wall construction must first be hoisted out of the recesses 33.

Fig.3 shows, that the wall construction W in its mounted position may be locked against folding or pushing down by persons by means of locking element 21 which e.g. is attached behind guide element 27. This locking element may be formed in an advantageous manner from the connection elements between the two adjacent floor frames V by e.g. mounting a bolt and nut connection just behind the guide element 27.

Fig.6 and 7 shows a stop element 34 positioned on the bottom edge 26 of the wall construction W which engages the longitudinal central profile when in mounted position, in order to prevent turning over or sliding through of the wall construction W. In order to lock the wall construction in its mounted position against raising or lifting up the rectangular headed or hooked element 28 of the guide element 27 may extend under the protruding edge 29 of the floor frame V, as shown in Fig.3.

In the foregoing described preferred embodiment a number of features and

elements are combined, but obviously the separate, non-combined, elements and features also fall within the scope of the invention.

Storage of the safety module constructions may be done in horizontal or vertical position. In horizontal position the fork openings 7 – 10 are directly accessible for a fork-lift truck. By choosing U-shaped reinforcement profiles 14 for the wall construction W the shores 16 and 17 may be easily received into the profiles 14 in folded down position of the safety module construction. As a consequence a hinged connection may be easily realised. The height of the wall construction W may be further increased by mounting of a number of anti clamber elements 22 with sharp protruding points 23. In the shown embodiment short tube segments are provided each on their outer circumference with four sharply pointed welded steel sheet segments 23 positioned under an angle of 90°. A number of this anti-clamber elements 22 is subsequently adjacently slided over a hollow tube having the same length as the top edge 26 of the wall construction W, see Fig.4, where after the hollow tube is connected on both ends to the extended end 24 of the upper edge of the profiles 11 of the wall construction W.

While using the safety modules, on its rear side and on both sides each of the vertical circumferential profiles 11 the usual lockable interconnections may be provided in order to connect adjacent wall constructions W in a reliable way into a continuous safety wall construction. In this way a reliable and stable wall construction is obtained with exceptionally high safeguarding, whereby the visibility of an object to be protected will be out of sight for the major part because of the completely closed wall construction W on its front side.

Claims